BE/EXTC/VIII (REV.) 13/5/2013.
Optical Fibre communication.

VT-F.H.Exam. April(1)-13-174

Con. 8209–13. **GS–3268**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of the remaining **six** questions.
(3) Assume **suitable** data wherever **necessary**.

1. (a) Discuss the basic block diagram of optical communication system. **5**
(b) Draw the refractive index profile for the step index and graded index fiber. For each type give typical core and cladding diameters. **5**
(c) Differentiate between spontaneous and stimulated emissions. **5**
(d) Derive expression for the responsivity of an intrinsic photodetector in terms of quantum efficiency and wavelength. **5**

2. (a) Draw refractive index profile of a graded index fiber and show with neat diagram transmission of light through this fiber. Explain how GRIN fiber has transmission bit rate much higher than multimode step index fiber. **10**
(b) Find the core radius necessary for single mode operation at 820 nm of step index fiber with $n_1 = 1{\cdot}482$ and $n_2 = 1{\cdot}474$. What is the numerical aperture and maximum acceptance angle of this fiber ? Calculate the corresponding solid angle. **10**

3. (a) List the important factors responsible for power loss in optical fiber. Explain each factor briefly. **10**
(b) Explain interamodal and intermodal dispersion. How does despersion affect the transmission bandwidth of optical fibers. **10**

4. (a) What is the basic principle on which optical sources work ? With the help of a LED structure explain its working. **10**
(b) Draw the structure of Avalanche Photo Diode (APD) along with the electric field profile that exist in the various regions of APD structure. Explain the working. **10**

5. (a) Explain modified chemical vapour deposition (MCVD) method of fiber fabrication in detail. **10**
(b) Discuss a popular non-destructive technique for attenuation measurement. **10**

6. (a) Describe two methods of splicing individual fibers together. What are the advantages and disadvantages of each method. **10**
(b) What are the desirable requirements of a good fiber optic connector ? What are the lensing schemes for coupling improvements ? **10**

7. Write short notes on any **two** :– **20**
(a) OTDR
(b) Link Power Budget
(c) Coherent and Concoherent optical transmission.

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